

NOvA Operations Summary

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All Experimenters meeting

Sept 14th 2015

NOvA Summary

- Work continues to optimize the performance of both detectors and is showing good progress
- Improvements in the DAQ, both to improve the stability of the system and add new features, to the hardware , the dry gas and water system and environmental systems
- The Run Plan is work on the detector is performed throughout the day with steady running at night.
- NOvA runs multiple non-beam triggers for which we try to keep the uptime as high as possible while taking advantage of the downtime to do detector maintenance and improvements

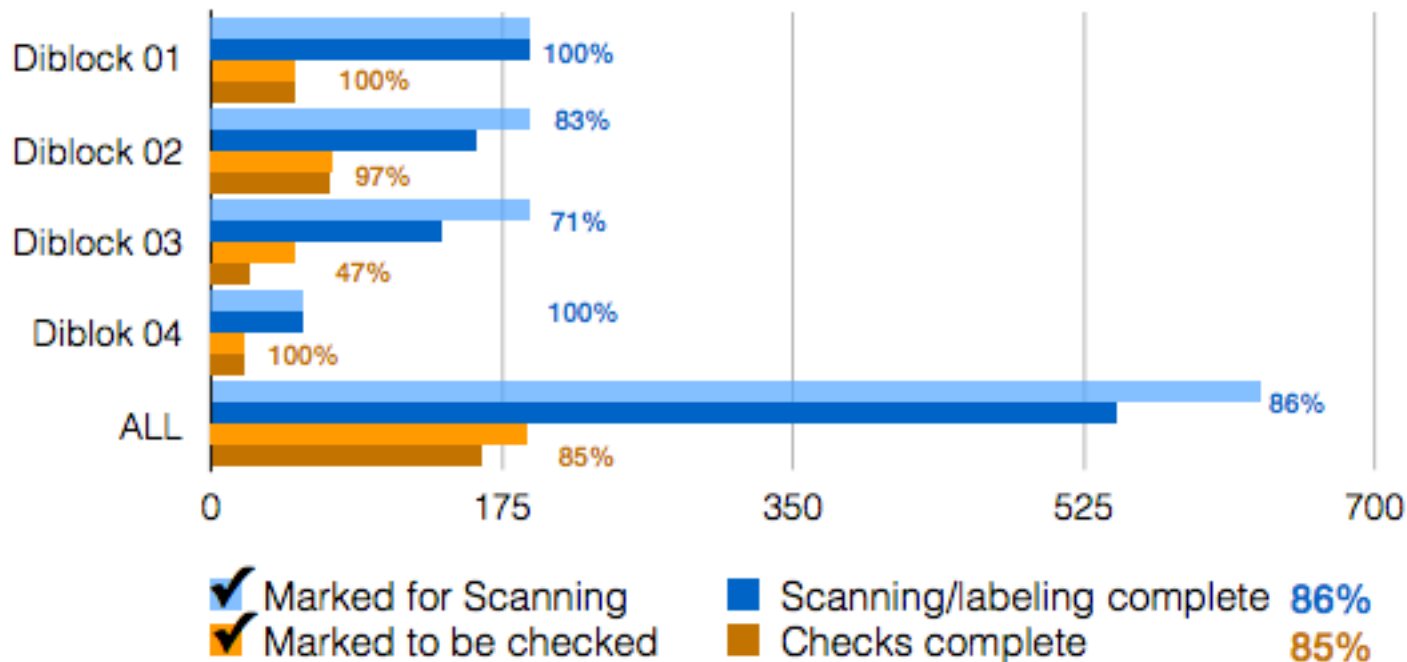
Chiller issue

- Issue seen over last week with one of our Far Detector chillers
- NOvA cools APDs to -15C using TEC but has water based cooling system for TECs, chillers use to remove heat load from water.
- Issue seen as one chiller would switched itself off briefly and water temperature would start to rise before that chiller turned itself back on or the backup chiller kicked in
- Water temperature can not rise to level that damage is caused to system but cooling does stop on many APDs which can be time consuming to recover from
- Resulted in more than 10 hours of downtime over the last week
- Issue chiller has been taken offline while cause is investigated.
- Determine alarm levels on water temperature not optimal and too much lag allow in chillers swapping to back up.
 - These are configurable and both of these changes are being implemented at the moment

Near Detector Shutdown summary

- NOvA Near Detector electronics show more noise than the FD electronics
- Check APD grounding cables and Thermoelectric Cooler cables on all channels which show a non-zero noise rate
- Work will be finished this week and results are looking very promising

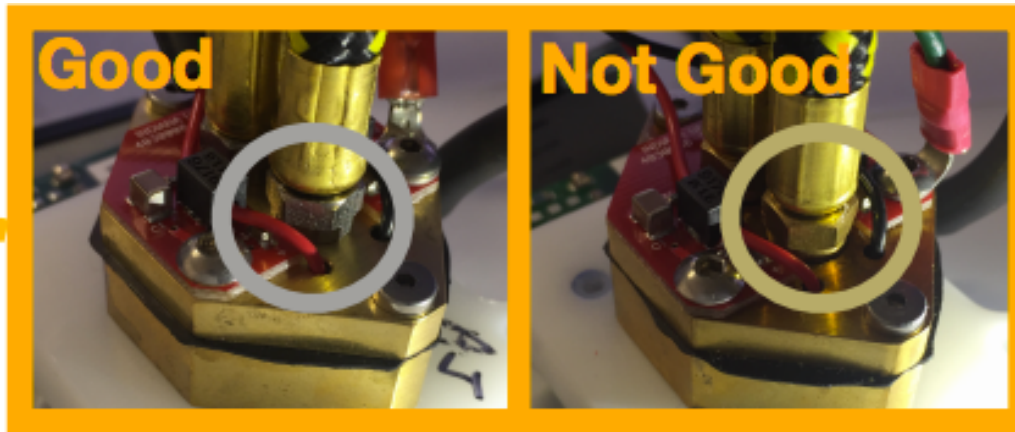
NearDet Maintenance progress as of September 9th



Near Detector Shutdown summary

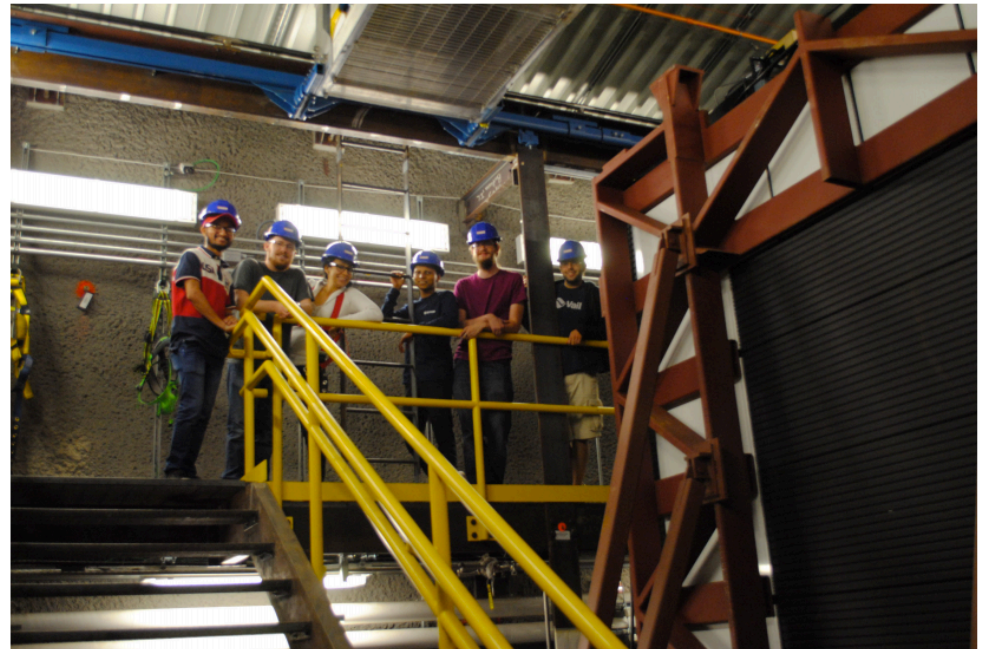
While FEB boxes were opened to check channels look advantage to do some additional improvements

- 1) Replaced non-optimally designed TEC labels with new improved design
- 2) Checked every channel for 'brass' TEC APD connectors



Near Detector Shutdown summary

Great team of 10 graduate students who have been trained and volunteered many hours of their time to this work



Far Detector work summary

- Mass checks of APD grounding cables and Thermoelectric Cooler cables for very channel for which we have seen a non-zero noise rate
- Checked 200 channels (out of 10,752) and about half channels had some issue which could be the cause the of issue.
- Been studying remaining quiet or noisy channels one by one
- New test bench been built at Ash River so channels with an issue seen can be tested straight away.
- Extensive use of our new DCMul8tor (Hand held digital oscilloscope) letting us study issue hardware in detail



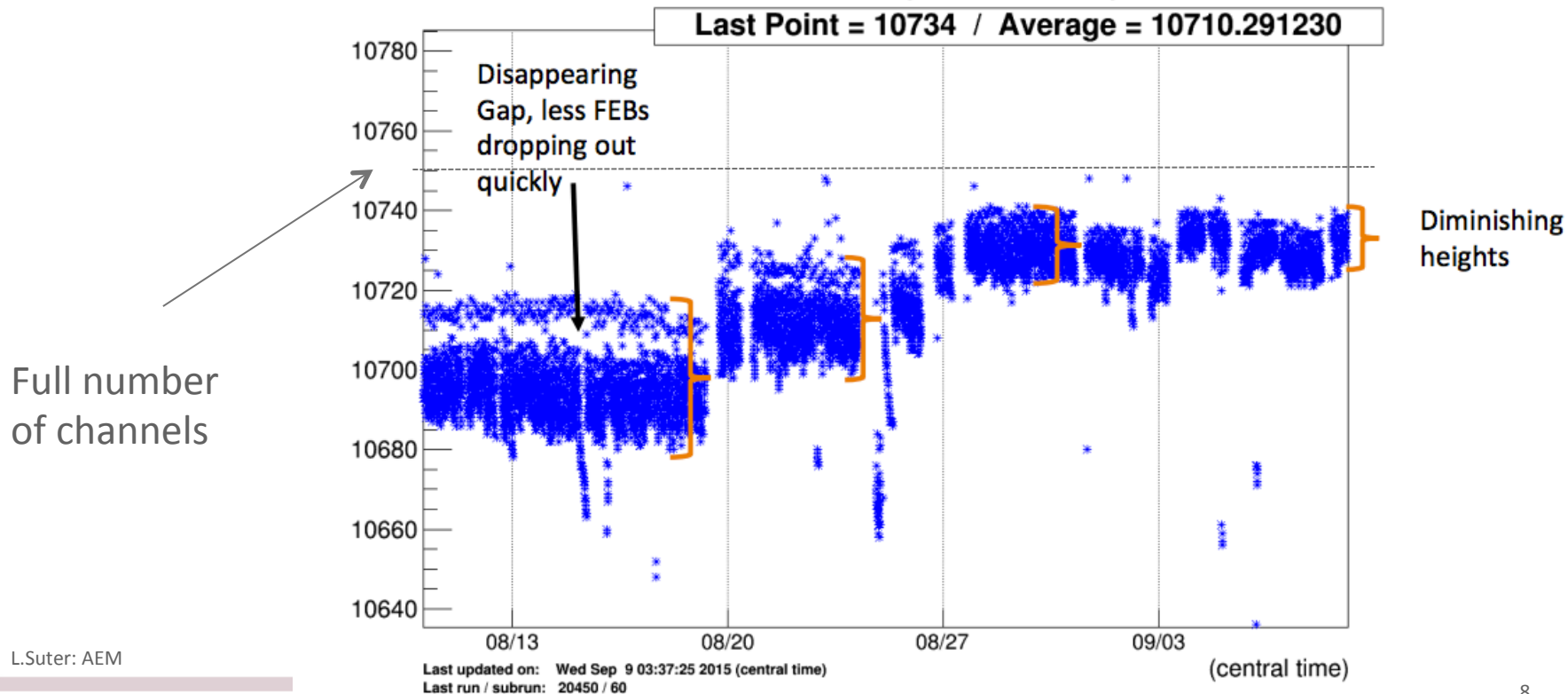
Far Detector work summary

At FD we see that a small subset of our channels regularly drop out (generally due noise spike overflowing output buffer) and we send out a recovery signal every hour to recover these channels

Looking at number of FEB that active per subrun over the last month can see that

- 1) We have more channels reporting in total
- 2) We have less channels dropping out
- 3) Channels are dropping slower

Number of Active FEBs per Subrun - partition 1



Far Detector work summary

One month ago

NOW

FEB Hit Rates (past 24 hrs.) - partition 1



Last updated on: Tue Aug 18 16:20:31 2015 (central time)
Last run / subrun: 20320 / 53

FEB Hit Rates (past 24 hrs.) - partition 1



Last updated on: Tue Sep 8 12:20:29 2015 (central time)
Last run / subrun: 20446 / 47

Looking at the average hit rate for each channel (over 14hr period)
can see how much noise across detector has decreased

DAQ shutdown work

- Have had program of DAQ over the shutdown both to improve the stability of the system and to add new features
- This and last week have also had DAQ Expert training shifts to train new people in the system

Example of last weeks improvements

- Improved protection mechanisms to make sure detector is in safe mode before timing work is done
- Work so flattening of database does not drop TimingDelayUnit delays
- Automatic start of our automatic channel recovery job
- Work planned for this week include looking on how we can distribute load on network, splitting load across multiple message loggers
- Lots of work on updating all procedure, documentation and building dedicated checklists for all common recovery and expert tasks.

Summary

Lots of great work has been done during the shutdown and in great shape for the return of beam!